



AIR FORCE HSI

311 HSW/PA CASE FILE #07-094

Success in Integration



Escape System Upgrade Program, T-38 Aircraft

Payoff

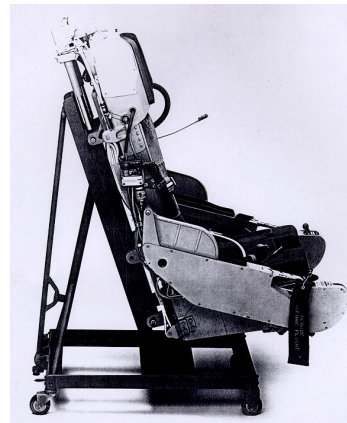
USAF training costs were reduced due to similarities in the T-6 and T-38 escape systems, and life cycle costs will be reduced by guaranteed parts availability for 20 years. The ejection envelope has been significantly increased from zero knots airspeed and zero feet altitude capability (lower envelope) to 550 knots airspeed and 50,000 feet altitude capability (upper envelope). Ejection initiation is the same as the T-6 and many operational fighters (including the F-16, Joint Strike Fighter) aircraft escape systems. Fewer injuries due to lower extremity flail and “wishboning” will be prevented by the active lower extremity restraint system. Chance of seat collision during ejection have been eliminated due to the addition of the sequencing system. The seat-mounted, mortar-deployed parachute provides a faster operating personal parachute with lower opening shock to the ejectee.

Accomplishment

Clearances of the knee, leg, and torso with cockpit structure, instrument panel, and controls were considered to reduce the possibility of human error and injury during ejection. The internal and external visual fields were improved and enhanced the mission by reducing vision-related stress and fatigue.

Human machine interface displays and automation were enhanced with an improved eye-to-instrument accommodation, flight control and instrument access, internal and external visual fields, and leg clearance. An HSI tradeoff affecting the crew comfort, habitability, and human interface of the larger percentile of the aircrews was due to the structural configuration of the aft cockpit, which is smaller and more compact.

Safety was further enhanced by a seat sequencing system. A command selector valve located next to the rear cockpit ejection seat allows the pilot-in-command to determine if the seats will be independently or sequentially initiated. The modular seat may be removed in parts and placed in a “maintenance” position for inspection, parts removal, or parts replacement, providing for ease of maintenance.



ABOVE: T-38 Northrop Ejection Seat

RIGHT: MK-16T Ejection Seat



The aircraft downtime and the time required to complete maintenance actions has been decreased. The AETC uses contract and Civil Service support to maintain its escape systems. Therefore, manpower and personnel improvements will benefit the contract and civil service labor. Training will benefit because the T-6 and the T-38 aircraft escape systems will be very similar.

Background

The T-38 is a high-altitude, supersonic jet aircraft that serves as a transition trainer between the T-6 and newer high performance aircraft. When every other system in the aircraft has been unable to keep the aircraft aloft, the pilots must resort to using an ejection seat equipped with a drogue chute for stabilization, and a rotary actuator to separate the seat from the pilot. A “zero delay” lanyard is then disconnected in order to reduce opening shock, and the ejected crewmember falls to a selected altitude.

HSI Domains Addressed: Manpower, Training, Human Factors Engineering, Environment, Safety, Occupational Health, Survivability, Habitability

Information Source: Based on T-38 Weapons System Capability Roadmap, 14 December 2004 and Review by Mr. R. French, AET